Syrian Arab Republic		**الجمهورية العربية السورية**
Ministry of Higher Education		**وزارة التعليم العالـــي**
Syrian Virtual University		**الجامعة الافتراضية السورية**

Mathematical Algebra Course Definition Form

1- Basic Information:

Course Name	Mathematical Algebra
Course ID	GMA101
Contact Hours (Registered Sessions)	36
Contact Hours (Synchronized Sessions)	18
Mid Term Exam	There is not
Exam	1.5
Registered Sessions Work Load	36
Synchronized Session Work Load	18
Credit Hours	6

2- Pre-Requisites: There is not

3- Course General Objectives:

This course aims to teaches the student the basic skills of a number of math's topics that qualify to understand the specialized courses. Where the student recognizes the basic concept of sets, set operations and concept functions. As recognized by numbers, particularly real numbers and its basic operations, then recognizes the polynomial arithmetic and fractions and Partial fraction decomposition. And then recognizes the trigonometry and trigonometric equations. It also recognizes complex numbers and its basic operations. And then recognizes the algebraic structures of groups, rings and fields and down to vector spaces and matrix, determinants and then using them to solve linear equations.

4- Intended Learning Outcomes (ILO):

Code	Intended Learning Outcomes
ILO1	Sets including number sets and its basic operations, concept of function between two sets
ILO2	Polynomial arithmetic, fractions and Partial fraction decomposition
ILO3	Trigonometry and solving trigonometric equations
ILO4	Complex numbers, its operations and solving complex equations
ILO5	Algebraic structures: groups, rings, fields, and morphisms
ILO6	Vector spaces and linear applications
ILO7	Matrix, determinants and using them to solve linear equations

5- Course Syllabus (18 hours of total synchronized sessions)

- **RS:** Recorded Sessions**; SS:** Synchronized Sessions**;**

ILO	Course Syllabus	RS	SS	Type	Additional Notes
ILO1	**Sets and functions** • Sets and its operations • Functions: types, composition, inverse	3	1.5	☒ Exercises	
ILO1	**Real numbers: equations and inequalities** • Real numbers and its operations • Algebraic equations with one unknown • Linear, quadratic inequalities	3	1.5	☒ Exercises	
ILO2	**Polynomials** • Polynomials operations • Polynomial arithmetic • fractions and Partial fraction decomposition	3	1.5	☒ Exercises	
ILO3	**Trigonometry** • Trigonometric ratios • Unit circle • Relations between angles	3	1.5	☒ Exercises	

	• Trigonometric equations, its solution				
ILO4	**Complex numbers** • Basic operations • Complex numbers representation • Complex equations, its solution	3	1.5	☒ Exercises	
ILO5	**Algebraic structures** • Groups, morphism between groups • Rings, morphism between rings • Fields, morphism between fields	3	1.5	☒ Exercises	
ILO6	**Vector spaces** • Vector spaces and subspaces • Set of vectors: spanning, independents, basis • Vector space dimention • Linear applications and morphisms	9	4.5	☒ Exercises	
ILO7	**Linear equations, its solution**	3	1.5	☒ Exercises	
ILO7	**Matrix and determinants** • Matrix operations • Linear application matrix • Determinants and its applications	6	3	☒ Exercises	

6- Assessment Criteria (Related to ILOs)

ISC	Interactive Synchronized Collaboration		Ex	Exams		Rpt	Reports
PF2F	Presentations and Face-to-Face Assessments		PW	Practice Work			

ILO Code	ILO	Intended Results	Assessment Type	
			ISC	Ex
ILO1	Sets including number sets and its basic operations, concept of function between two sets	1. Using Venn diagrams 2. Finding type function **3.** Finding composition and inverse	X	X

ILO2	Polynomial arithmetic, fractions and Partial fraction decomposition	1. Addition, subtraction, multiplying and division of polynomials 2. First and second Polynomial decomposition **3.** Partial fraction decomposition	X	X
ILO3	Trigonometry and solving trigonometric equations	1. Solving triangle **2.** Solving trigonometric equation	X	X
ILO4	Complex numbers, its operations and solving complex equations	1. Writing complex numbers in the algebraic, trigonometric and exponential form **2.** Solving complex equations	X	X
ILO5	Algebraic structures: groups, rings, fields, and morphisms	1. Proving that an Algebraic structures is a group, ring or field **2.** Proving that a set is subgroup, subring or subfield 3. Proving that an application is morphism	X	X
ILO6	Vector spaces and linear applications	1. Proving that an Algebraic structures is a vector space **2.** Proving that a set is subspace 3. Finding the sum of 2 vector spaces **4.** Proving that a set of vectors is spanning, independents, basis 5. Proving that an application is linear 6. Finding kernel and Image of a linear application 7. Finding the dimension of a vector space 8. Finding the rink of a set of vectors	X	X

ILO7	Matrix, determinants and using them to solve linear equations	1. Basic operations on matrix: addition, subtraction and multiplying **2.** Finding the matrix of a linear application **3.** Finding the inverse of a matrix **4.** Finding the determinant of a matrix **5.** Solving linear equations	X	X

7- Practice Tools:

Tool Name	Description

8- Main References

9- Additional References
